DOCUMENT RESUME

ED 240 945 HE 017 054

AUTHOR Strange, John H.
TITLE Preparing for Today Tomorrow: Faculty Training for the New Technologies.
INSTITUTION American Association for Higher Education, Washington, D.C.
PUB DATE Oct 83
NOTE 6p.
PUB TYPE Journal Articles (080) -- Viewpoints (120)
JOURNAL CIT AAHE Bulletin; v36 n2 p10-14 Oct 1983

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; Computer Oriented Programs; *Educational Change; *Educational Technology; *Elementary Secondary Education; *Futures (of Society); *Microcomputers; *Postsecondary Education; Prediction

ABSTRACT

Predictions about the use of new technologies in education are discussed, along with 10 mistakes that many higher education practitioners are likely to make. Events predicted to occur by 1985 include the following: 80 percent of all secondary and postsecondary students will own their own computers; 20 percent of all postsecondary faculty, 25 percent of all secondary faculty, and 30 percent of all elementary faculty will own their own computers; 60 percent of all students in grades 1-8 will be regularly using computers at home, in school, or both; and 40 percent of all postsecondary students and 20 percent of all postsecondary faculty will be regularly using word processors. Predictions by 1987 are also included. The mistakes that are projected include the following: higher education will probably continue to emphasize larger, institutionally-owned technologies as opposed to the new personal technologies; colleges will wait too long to adopt the new technologies; it will be required that everyone learn a computing language (rather than how to use the new technologies); the impact on the educational organization will not be anticipated; too many students will be steered to technology fields; faculties will continue to be organized around disciplines, the teaching of facts, and grading based on factual acquisition; and the use of computers as tutors will be overemphasized. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

PREPARING FOR TODAY TOMORROW:
Faculty Training for the New Technologies

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

AAHE

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy

by John H. Strange

ED240945

This paper is a late-summer adaptation of a talk I delivered last March at AAHE's National Conference on Higher Education. I say this because one of the most important points I will make is that things are changing so rapidly in the arena of new technologies, especially microcomputers, that material presented in traditional printed form is often out of date by the time it is available for distribution. Certainly in the months since this talk was first given, dramatic changes have taken place.

Coleco, for example, a major manufacturer of video games, has announced that it will deliver this fall a microcomputer that includes a slow, but letter quality, printer for less than $600. Its "Adam" model will make word processing possible for a large number of people who in March of this year would have faced a minimum expenditure of $2200 for the same capability. A truly mass market machine like this can make a radical difference in what will happen and how fast it will happen.

A second development reveals the magnitude of the changes that surround us. In March, manufacturers were cautiously optimistic about prospects for sale of microcomputers and related equipment. Still, chip manufacturers were glutted with components. By midsummer, though, demand had increased to the point that microcomputer manufacturers faced allocations for the delivery of chips; demand in some cases was six times what it had been just a few months earlier.

In March, no one was making accurate predictions about these developments. A paper prepared then and published now on these topics would be hopelessly out of

HE 017 054

John H. Strange is a professor in the College of Community and Public Service at the University of Massachusetts-Boston. Before moving to Boston, he was vice president of the Council for the Advancement of Experiential Learning in Columbia, Maryland.

date. In most professional areas, papers prepared for printing will soon be a thing of the past. Instead, articles will be entered into a national data base and will become available instantly.

The National Association of School Public Relations Officials (NASPA), is already using data bases as a regular part of its work on the secondary education level. When the recent "A Nation at Risk" report was released, NASPA had the entire text—including the executive summary—on-line immediately. All school superintendents had to do was access the Source and either read or print out whatever portion of the report they desired at the very time the text was being transmitted over the wire services. By the year 2000, the authors of *Gutenberg II* (Godfrey, Parkhill, Madden and Ouimet) predict we will have all information in all places at all times. Those of us in higher education are unprepared for such a day. In fact we cannot even conceptualize such a reality.

It is in this context that I have entitled this article "Preparing for Today Tomorrow." It is my belief that we are woefully late in whatever preparations we will make, and that the prospects for a rapid adaptation are not observable in higher education.

I have suggested that none of us are prepared to predict accurately the nature of the changes that will affect us, nor their speed, and having suggested that their magnitude will exceed our expectations, I nevertheless, am foolish enough to speculate here about changes in the use of the new technologies in education. It is useful to be able to accurately label these as "Some Strange Predictions."

Some Strange Predictions

In the summer of 1982, I suggested that by 1985, eighty percent of all secondary and post-secondary students would own their own computers. This was a radically different prediction than others being made at that time. I also boldly predicted that by 1985, thirty percent of all students in grades 1-8 would be using computers regularly in school and/or at home, and that 20% of all post-secondary students would regularly be using word processors.

By March, even my predictions, which I had thought optimistic at the time, seemed terribly cautious. Let me throw all caution

V36 n2

to the wind and offer these expanded Strange predictions:

By 1985

- 80% of all secondary and post-secondary students will own their own computer
- 20% of all post-secondary faculty, 25% of all secondary faculty, and 30% of all elementary faculty will own their own computers.
- 60% of all students in grades 1-8 will be regularly using computers at home, in school, or both.
- 40% of all post-secondary students and 20% of all post-secondary faculty will be regularly using word processors.

By 1987

- 80% of all post-secondary students, 50% of all secondary students, 40% of all faculty at all levels, and 30% of all fifth graders will be using word processors regularly.

In making these predictions, I want to make three points. First, the changes that are taking place are more rapid and extensive than we imagine or realize. Second, the new technologies will be adopted by students and elementary and secondary faculty before faculty in higher education adopt them. And third—and this is really not a prediction but a guarantee—those who do use word processors and accept the new technologies as useable tools, will be more successful, will have better incomes, will make better grades or get more rewards, and most significantly, will have more power than those who do not. What I am really talking about is power, who has it, and what advantages will accrue to those who have it.

What do I mean by "power" and why are these predictions important? If I am at all correct in my predictions, it is a certainty that the 30 percent of fifth graders regularly using word processors will not be randomly distributed among socio-economic groups. Rather, they primarily will be from families which already have access to information and education. This gap in use of the new information tools will, most likely, widen the economic gap in this country. Furthermore, a similar gap may occur along two additional fronts. Younger members of our society are likely to master the technologies much more rapidly than the adults of today. We can also expect a gap to develop between educational sectors in this country. If use of the new information technologies do spread first at the elementary and secondary levels, we can expect some outcries from students who arrive at the doors of higher education institutions which are unprepared for their level of competence.

What do we do about these developments? There is much that we should be doing, but let me concentrate here on some suggestions for faculty training for the new technologies.

Ten Mistakes We Will Make

I do not consider myself a pessimist. But as I look around me in higher education, and as I observe resistance to the new technologies, I am often discouraged. Consequently I will focus on ten mistakes that many of us in higher education are likely to make in addressing the issues that stem from the information revolution. Perhaps these predictions will be as dated as my other predictions, but I hope they help us avoid at least some of the pitfalls along the way.

MISTAKE #1—The new technologies are *personal*—yet we will choose other technologies.

Probably the most important characteristic of the new technologies is that they are personal. Yet higher education will most likely continue to emphasize larger, institutionally owned technologies.

There are several reasons for this. First, we in higher education already have made a considerable investment in central computing facilities and the natural tendency is to add to what we have. Second, purchasing decisions will be influenced by those who control and are politically tied to central computing facilities. These people are unlikely to support a radical dispersal of computing power to individual owners. Third, campus-wide use of central computing facilities subsidizes the use of that equipment with a limited number of large research projects (projects that would indeed be difficult to sustain if they had to bear the continued costs of the expensive computing equipment alone). Fourth, many of our instructors are reluctant to give up the control that stems from the use of one large computer with common access to data files. And finally, we do not yet realize what the impact will be when every student has his or her own computer in terms of the use of those computers as tools to be used regularly in the study of all subjects rather than as a course of study in themselves.

But it is crucial . . . to understand that computers are now, or soon will be, personal tools and we must encourage their use as such by students and faculty.

The debate over microcomputers vs. mainframe systems is occuring in a large number of institutions right now. My position is clear. I believe that we must first supply as large a proportion of our students with regular access to personal computers, and then we must provide linkages between our students and faculty through larger mini or mainframe computers. This approach ignores the legitimate needs of a selected few of our faculty for large machines for research purposes. Where possible, these needs must also be met. And it also ignores the special need of those institutions with large engineering programs (although it is interesting that engineering departments are among the first to adopt the goal of a personal computer for every student). But it is crucial, I believe, to understand that computers are now, or soon will be, personal tools and we must encourage their use as such by students and faculty.

MISTAKE #2—We will wait too long to adopt the new technologies.

A friend who is an academic dean at an important liberal arts college for women asked me the familiar question: "Is there going to be a radical price break this fall and should we delay a major purchase of personal computers until the spring term?" This question is common and is understandable

given the limited resources available today to our institutions of higher education.

The unfortunate reality is that the answer to whether it will be cheaper and faster next spring will always be "Yes." If we wait until it stops getting cheaper and faster, we will wait forever. But, the costs to our students who will not learn to use the new technologies because we put off a purchase are so great that we cannot even put a price tag on them.

How can we establish a comparison of the costs to our students resulting from our delays and the cash savings that will result from a delay until spring? We cannot. We must invest *now*, and then depreciate that investment rapidly and be ready to invest again in the spring and again next year.

MISTAKE #3—We will insist that everyone needs to learn a computing language—to become a technician.

Computer literacy is all the rage in many quarters these days. Unfortunately, in my opinion, the emphasis is often placed on learning the technical aspects of BASIC or PASCAL or other programs. What other options do we have? My suggestion is that we establish as our goal not technical competence for everyone, but instead the acquisition of the skills to use the technologies as tools. I believe that no high school or college student after today should graduate unless he or she can use the new technologies (especially personal computers) as word processors, financial management tools, and data management tools. Everyone will need these tools to increase their success at work in the very near future. Those who possess these skills will have distinct advantages in getting those jobs, and in being successful in them.

Once these skills have been acquired by students (and our faculties, for they too must use the tools required of the students), we must incorporate their use into our regular instructional program. For example, we should use word processors to teach writing. Seymour Papert, in his book *Mindstorms: Children, Computers, and Powerful Ideas,* argues that the most important thing we could do to improve writing in this country is to give every fifth grader a word processor. It will work equally well with first-year college students.

There are two reasons. First, the considerable amount of time saved by writing with a word processor can be better used working on writing skills. One ninth grade class that used word processors covered a 14-week curriculum in nine weeks. Second, the orientation of the writer changes when using a word processor. The goal is no longer to finish a piece of work. Rather, it becomes a continuous process of improving writing by revising it, rearranging material, and adding additional arguments and facts. This focus on improving what a student is doing is an important change. It becomes possible because the investment of time necessary for revisions when using a word processor is minimal. Consequently we will do more of it and become better writers.

Of the ten jobs the [Labor] department predicts will grow most in the next decade, not a single one is "high tech."

We can use the financial management or forecasting tools in economics, business, math, and a variety of other subject areas. Not only are they tools for financial prediction and calculation, but we can also easily construct economic models and use them for simulating businesses or entire economies. All subjects lend themselves to the use of data management tools. In the immediate future our emphasis will be on learning dBASE II, Personal PEARL, or one of the other data base programs available for personal computers. Their use can be applied to political science, anthropology, art, or English. In the near future we will add the use of local, regional, and national data bases to that set of tools. Research is already changing because of such data banks and our students need to know that process now, just as they will need to learn it later in employment.

One does not have to be a technician to use the new technologies as tools. In fact, the emphasis on learning the technical programming language skills probably inhibits the development of the necessary tools. Many people will be frightened away from them if they think they must be technicians first. Moreover, the languages being taught today, such as BASIC, PASCAL, COBOL, etc., are a lot like regular gasoline; they will be around for a long time. But new languages such as SMALLTALK, will enable everyone to be a programmer almost instantly. And if our faculties spend enormous energy and time learning a language they will never really use, and that the most recent high school graduate can handle more effectively, and that will soon be replaced by an even easier language, we can rest assured that they will hold *someone* responsible for steering them in the wrong direction.

MISTAKE #4—The technologies are not just computers.

Most peoples' tendencies will be to regard the new technologies as computers, and just computers. That would be most unfortunate. Although this is not the place or medium in which to discuss in detail the other technologies that will affect us, one is important enough to educators to mention now—the laser videodisc. The laser videodisc provides us with the opportunity to store and access video and audio information randomly and at low cost. Unfortunately, only a few higher education institutions are seriously exploring laserdiscs (MIT, the University of Nebraska/Lincoln, the University of Iowa, the University of Utah). This technology should be known to all educators, and we should begin investing in the development of instructional materials. We ignore it at our peril.

MISTAKE #5—The impact on our organizations may be more important than all other impacts—and we may fail to anticipate those changes.

John Naisbitt in *Megatrends* suggests that one of the most important results of the new information technologies will be the decentralization of power in institutions. This will be even truer in academ-

ic institutions where power is already considerably diffused. The reason is simple. With information accessible and usable to the individual, organizational control becomes a very different thing.

I am not going to elaborate here on the many changes that are likely to occur along these lines; my point is to draw attention to organizational issues that stem from the information revolution. The most important of these is the fact that learning will become much more of an individual activity, rather than a group activity as we make it appear to be in our structured classrooms. Few of our institutions are prepared for it. It is quite likely that the institutional arrangement for higher education as we know it today will continue to exist in only the most rudimentary form by the year 2000.

MISTAKE #6—Careers are changing rapidly and we may well steer our students in the wrong directions.

State governors have been working excitedly to lure high tech industries to their states as a way of protecting their economic bases. We in higher education are similarly lured. A recent book, *Global Stakes,* argues that we need a massive infusion of federal and local dollars for engineering, science, and math in order to meet the impending technological challenge from other countries, particularly Japan. Other arguments abound that the technical arena is the place to be.

But, the predictions of the Department of Labor suggest a different orientation. Of the ten jobs the department predicts will grow most in the next decade, not a single one is "high tech." Naisbitt draws our attention to similar trends. Yet we react by creating more technical programs which focus on technical skills development. The skills that will be vital to all of us in the information age will be to use the technologies as tools and to develop affective, cognitive, and interpersonal skills that are currently emphasized in good undergraduate liberal arts programs. Certainly some of our students will find success in technical employment. And we must make major investments in technological research. But to become enamored by high technology to the detriment of other educational goals would be a serious mistake. We will have to be alert to avoid that pitfall.

MISTAKE #7—Even though facts become less important (because they are so readily available) we will continue to organize faculties around disciplines, teach facts, and grade on factual acquisition.

"All facts in all places at all times." This seems unimaginable to most of us in higher education. For years, we have labored to gather a storehouse of factual information in our heads and on our 3x5 index cards. But the predictions made in *Gutenberg II* will soon be upon us. We are not ready for them. We still act as if the great goal is to teach facts. Certainly we grade that way. Any examination of the way grades are allocated in higher education will clearly show that current knowledge at the time of the examination plays the major role. We also consider, to a lesser extent and much more haphazardly, writing ability and cognitive skills.

Yet when we are asked to differentiate our good students from our less effective students, we speak of important affective behaviors such as curiosity, motivation, attending to values, decision-making, ability to handle ambiguity, challenging accepted truths, ability to adapt quickly, and self confidence as learners. Still we emphasize facts in the classroom.

In the future we will have to spend much more time on cognitive skills, affective behaviors, and interpersonal skills. People will have to know where and how to get factual information and how to use it. But we will not have to be walking storehouses of factual information. That will be available on computer discs, laser videodiscs, and data bases.

The new technologies, if we use them correctly, can assist in the development of these skills. I especially commend the computer language LOGO. LOGO is an important tool that can be used at all grade levels to improve cognitive skills and affective behaviors. I would suggest that LOGO be the first computer language learned, whatever the students' ages, not as a language but as a route to important cognitive and affective learning objectives. LOGO has the additional advantage of being much easier to learn than other languages, and there is evidence that LOGO can build self-confidence in learners. In addition, once a student has learned LOGO, BASIC can be learned much more rapidly.

MISTAKE #8—We will overemphasize the use of computers as tutors and overlook their use as tools and the impacts they have on values and society.

What do we do with computers? We teach technical and programming skills and we use them as tutors. That is how we conceive of their use, at least at the post-secondary level.

Higher education must invest its own funds in the new technologies and in faculty training.

This is unfortunate and unnecessary for several reasons. I have already argued that we must all use the new technologies as tools, and that these tools can enhance instruction in subjects we currently teach. I also believe that we must take another step and address the value questions that arise from the technological revolution. The predictions of Feigenbaum and McCorduck in *The Fifth Generation* that we may have computers as intelligent as human beings by the year 2000, and that these machines may be created by the Japanese, open huge numbers of ethical, political, and economic topics for debate. We are talking about a time when our current first graders will be 23 or 24 years old. Our first-year students in college will be 36 or 37. What should we be doing to prepare them to make the political and economic decisions that arise from the existence of ingelligent machines that may even reproduce themselves?

What about equity issues that stem from unequal access to the new technologies that now exist?

The increasing power that access to these tools will give students will be extremely important. But most students will not have these tools. Who will raise the values questions that flow from such circumstances? Beyond individual inequities, what about those countries that are not even fully industrialized yet, just as we move out of the industrial era and into the technological era? What new economic and political questions must we address? Surely we must address the values questions. If it is not on our agenda for liberal learning who else will raise them?

MISTAKE #9—We will fail to make the investment of time and money required to meet the challenges of the new technological age.

Computers, laser videodiscs, and other technologies cost money. Higher education is not in an especially healthy financial condition, nor, for that matter, is secondary education. In the technological era there will be an enormous need not just for equipment but for faculty training and development. Yet higher education does not even see this as a necessity, much less make it a priority.

During the past year, I have conducted over 100 faculty training sessions. Most were at the secondary and elementary level. When I have been contacted (infrequently) by higher education institutions, I have been told that they cannot afford the training, they do not have access to the necessary equipment, or both. These institutions simply will not survive without a substantial financial commitment to their future, and it cannot all be "in kind" services or come from foundation grants. Higher education *must* invest its own funds in the new technologies and in faculty training. To do anything else is to "hasten our redundancy," as the British so quaintly put it.

MISTAKE #10—The information age will require great creativity, yet we are likely to continue to focus on the past.

One of the things that academic institutions do so well is to focus attention on the past. How can we turn that attention to the future?

I have three suggestions that grow out of a visit I made to the Museum of Science in Boston. An exhibit there focused on creativity. Twenty individuals had been selected from twenty career areas including art, music, science, economics, architecture, and literature. As I engaged in that exhibit I was struck by several things. First, I was learning an enormous amount and there was not a single "teacher" in sight. Second, I pondered the question of what made these individuals, selected as most creative from thousands of their peers, special and unique. What made them uniquely creative?

I came up with three ideas. First, all of those individuals, whatever their fields of interest, started with a view of the future. They were future-oriented—not wedded to the past. Second, all of them had changed directions in their work many times. They recognized serendipitous events and took advantage of them. Finally, they each took risks—personal risks as well as professional risks.

It seems to me that much the same is necessary in our educational institutions as we progress into the information age. We must orient ourselves to the future. We must expect to change directions and take advantage of new paths when the right opportunity comes along. But, most importantly, we must take risks.

ANNOUNCING:
Ten Workshops
Microcomputer Training for Academic Users

At the 1983 National Conference, Victor Baldridge and Kenneth C. (Casey) Green teamed to deliver three highly successful workshops on microcomputer applications for academic users. The timeliness and importance of the topic, and continued demand from academic administrators for a "hands-on" introduction to microcomputing, led us to ask Vic and Casey to help bring an expanded version of the workshop to a national audience.

Starting in November, AAHE will offer ten 1½ day workshops on microcomputers in selected cities around the U.S. Each workshop combines formal presentation with actual work on a micro aimed at providing you with beginning skills in budgeting, data-base management, graphics, and word processing; criteria for selecting hardware and software; and advice on developing campus-wide microcomputer systems. Most workshops will be held at Apple Computer, Inc. or Digital Equipment Corporation training facilities thus enabling you to see and use the latest microcomputer technology.

The cost for AAHE members is $195, a $50 savings over the regular workshop price of $245. Workshop enrollment is limited by the number of microcomputers available at each training site; registration will be handled on a first-come, first-served basis.

For additional information about the workshop series, including registration and hotel materials, please write to Louis S. Albert, Director of Special Projects, c/o AAHE, or call him at (202) 293-6440.

Boston November 7-8	**Atlanta** March 26-27
San Francisco/Oakland January 23-24	**New Orleans** March 28-29
Seattle January 25-26	**Boston** April 30-May 1
St. Louis February 13-14	**New York** May 2-3
Denver February 15-16	**Washington, DC** May 21-22